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Application No. 09/589,675

REMARKS

In the Official Action mailed 20 June 2002, the Examiner reviewed claims 1-34. Claims 1-3, 9, 10, 14, 22, 24, 25, 27-30, 33 and 34 were rejected under 35 USC 102(b); claims 4-8 and 11 were rejected under 35 USC 103(a); claims 12, 13 and 23 were rejected under 35 USC 103(a); claims 15, 16, 31 and 32 were rejected under 35 USC 103(a); claims 17-21 and 26 were objected to as dependent upon a rejected base claim; and claim 33 was objected to as a "substantial duplicate of claim 1."

Applicant amends claims 1, 17, 22, 26 and 33, and cancels claim 34 as set forth above. Claims 1-33 remain pending.

The Examiner's rejections and objections are respectfully traversed below.

Rejection of Claims 1-3, 9, 10, 14, 22, 24, 25, 27-30, 33 and 34 under 35 USC 102(b)

The Examiner rejected claims 1-3, 9, 10, 14, 22, 24, 25, 27-30, 33 and 34 under 35 USC 102(b) as anticipated by Eckhouse (U.S. Patent No. 5,170,772). This rejection has been maintained over Applicant's arguments set forth in the AMENDMENT mailed 20 March 2002, that Eckhouse failed to teach the fluorescent element recited in the independent claims.

① Applicant acknowledges, as the Examiner points out, that Eckhouse does disclose the use of the fluorescent material at column 5, lines 56-59. This oversight by Applicant in the review of Eckhouse is regretted. However, this does not change the fundamental teaching of Eckhouse which is directed to the use of a broadband source of radiation having a broad spectral band which includes harmful radiation, and the use of filters to block harmful radiation during treatment. The embodiment described at column 5, lines 56-59, uses a fluorescent source which absorbs some of the undesirable radiation and emits beneficial radiation that remains within the broad spectral band of the broadband source of radiation. Eckhouse is simply shifting energy within the spectrum of the broad band pump source. Eckhouse does not teach the use of a fluorescent element to convert a narrow band pump source to a peak emission wavelength outside of the pump source spectrum. This distinction is significant, for example, when the entire usable spectrum of a narrow band pump source is clinically

Applicant failed to disclose the use of the fluorescent element in the independent claims.

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suboptimal and the fluorescent conversion is used to shift the peak emission wavelength outside of the pump spectrum to a clinically useful and distinct spectrum.

Accordingly, Applicant has amended independent claims 1, 22 and 33 to require that the pump source have a narrow spectral band, and that the emitted radiation have peak emission outside the narrow spectral band. One example described in the specification includes a pump source comprising a frequency doubled Nd:YAG laser, which by definition has a narrow spectral band at about 532 nm, and a fluorescent element including rhodamine 6G inducing a Stokes shift with a peak emission at about 560 nm, as illustrated in Fig. 5, outside the narrow spectral band of the pump laser. Other fluorescent materials can be used which emit other peak emission wavelengths.

Independent claim 34 has been canceled.

The dependent claims 2, 3, 9, 10, 14, 24, 25, and 27-30 are believed allowable for at least the same reasons as claims 1 and 22, from which they depend, as amended. Furthermore, such claims are believed allowable for the combinations recited.

Accordingly, reconsideration of the rejection of claims 1-3, 9, 10, 14, 22, 24, 25, 27-30, and 33 is respectfully requested.

Rejection of Claims 4-8 and 11 under 35 USC 103(a)

The Examiner rejected claims 4-8 and 11 under 35 USC 103(a) as unpatentable over Eckhouse in view of Sinofsky (U.S. Patent No. 6,270,492 B1) and Byren (U.S. Patent No. 4,853,528). Applicant submits that claims 4-8 and 11 are allowable for at least the same reasons as claim 1, as amended. Furthermore, such claims are believed allowable for the unique combinations recited.

Accordingly, reconsideration of the rejection of such claims is respectfully requested.

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Rejection of Claims 12, 13 and 23 under 35 USC 103(a)

The Examiner rejected claims 12, 13 and 23 under 35 USC 103(a) as unpatentable over Eckhouse in view of Talpalrui (U.S. Patent No. 6,171,302 B1). Applicant submits that claims 12, 13 and 23 are allowable for at least the same reasons as claims 1 and 22, as amended.

Furthermore, such claims are believed allowable for the unique combinations recited.

Accordingly, reconsideration of the rejection of such claims is respectfully requested.

Rejection of Claims 15, 16, 31 and 32 under 35 USC 103(a)

The Examiner rejected claims 15, 16, 31 and 32 under 35 USC 103(a) as unpatentable over Eckhouse in view of Braun et al. (U.S. Patent No. 5,425,754). Applicant submits that claims 15, 16, 31 and 32 are allowable for at least the same reasons as claims 1 and 22, as amended. Furthermore, such claims are believed allowable for the unique combinations recited. Accordingly, reconsideration of the rejection of such claims is respectfully requested.

Objection to Claims 17-21 and 26

The Examiner objected to claims 17-21 and 26 as dependent upon rejected base claims. Applicant has amended claims 17 and 26 to incorporate the subject matter of their respective base claims. Accordingly, reconsideration of the objection to claims 17-21 and 26 is respectfully requested.

Objection to Claim 33

The Examiner objected to claim 33, as being a "substantial duplicate of claim 1." Applicant respectfully requests reconsideration. Claim 33 includes the pump radiation source as an element of the claim. Accordingly, the scope of the claim is not substantially the same as that of claim 1.

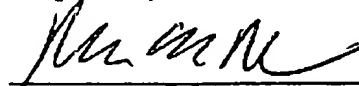
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CONCLUSION

It is submitted that the present application is now in form for allowance, and such action is respectfully requested.

Respectfully submitted,



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APPENDIX UNDER RULE 1.121

Please amend claims 1, 17, 22, 26, 33 as shown below:

1. (amended) A device for irradiating tissue, comprising:

a fluorescent element positioned to receive pump radiation having a narrow spectral band and responsively generate emitted radiation, the emitted radiation having [substantially different spectral characteristics with respect to the incident radiation] peak emission outside said narrow spectral band; and

a redirector for redirecting at least a portion of the emitted radiation toward a tissue target.

17. (amended) [The device of claim 1,] A device for irradiating tissue, comprising:

a fluorescent element positioned to receive pump radiation and responsively generate emitted radiation, the emitted radiation having substantially different spectral characteristics with respect to the incident radiation; and

a redirector for redirecting at least a portion of the emitted radiation toward a tissue target, wherein the redirector comprises a waveguide including a reflective entrance face and reflective walls, the entrance face having a substantially transmissive aperture formed therein for admitting pump radiation into the waveguide.

22. (amended) A method for irradiating tissue, comprising the steps of:

directing pump radiation within a narrow spectral band onto a fluorescent element;
responsively generating emitted radiation at the fluorescent element, the emitted radiation having [spectral characteristics substantially different from the incident] peak emission outside said narrow spectral band of the radiation;

receiving a portion of the emitted radiation at a redirector; and

redirecting the received portion of the emitted radiation toward a tissue target.

26. (amended) [The method of claim 22,] A method for irradiating tissue, comprising the steps of:

directing pump radiation onto a fluorescent element;

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responsively generating emitted radiation at the fluorescent element, the emitted radiation having spectral characteristics substantially different from the incident radiation;
receiving a portion of the emitted radiation at a redirector; and
redirecting the received portion of the emitted radiation toward a tissue target, wherein the step of redirecting the emitted radiation includes reflecting the emitted radiation from the boundary between a waveguide core and cladding material, the cladding material having a substantially lower index of refraction than the waveguide core.

33. (amended) A system for irradiating tissue, comprising:

- a pump radiation source for generating pump radiation having a narrow spectral band;
- a fluorescent element positioned to receive the pump radiation and responsively generate emitted radiation, the emitted radiation having [substantially different spectral characteristics with respect to the incident radiation] peak emission outside said narrow spectral band; and
- a redirector for redirecting at least a portion of the emitted radiation toward a tissue target.